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# Bilingual Speech Perception: What the Brain Thinks

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# My previous research

- Speech perception of bilingual children and adults.
- Spanish-English speakers.
- Fluent bilinguals.

# Gating task

- Small (70 ms) segments of a word are presented at the end of a carrier sentence.
- The words and carrier sentences can be in either Spanish and/or English. Hence, 4 conditions of presentation exist:

- Spanish sentence English word
- Spanish sentence Spanish word
- English sentence Spanish word
- English sentence English word.
- Hence, code mixed stimuli presentations

# Previous Results

- Bilingual participants seem to have better retrieval when words begin with voiced consonants (brillo, brush) vs. voiceless consonants (plata, plate) and when the vowels are tense (libro, leash) vs. lax (car, cup- lax vowels only in English).

- 3 age of arrival (age of exposure to English) groups compared (early, middle, late bilinguals). Middle bilinguals performed best (i.e., sufficient Spanish skills and adequate English exposure are needed for positive language transference from Spanish to English are needed).

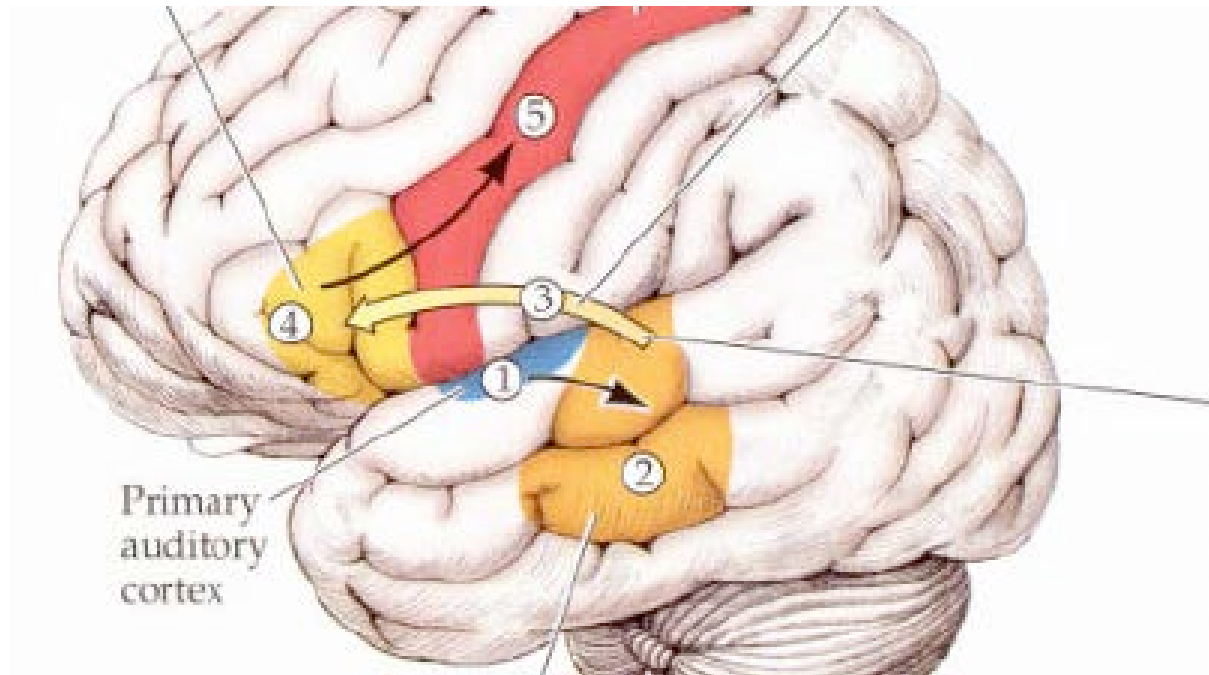
- Overall, all 3 bilingual groups performed comparably. Hence, the bilingual brain appears to process both Spanish and English within near equal time frames.

# Children vs. Adults

When comparing early bilingual children vs. adults, it was found that children took longer to identify the stimuli under all conditions. Hence, developmental differences in brain perception of speech sounds occurs. Exposure matters.

This suggests proximity of brain localization for Spanish and English (at the same area or near areas for brain processing- e.g., primary auditory cortex, superior temporal gyrus; supramarginal gyrus, angular gyrus; superior longitudinal fasciculus III; arcuate fasciculus; dorsolateral prefrontal cortex).

Gerschwind model. Speech perception occurring, Auditory Association area-> Supramarinal gyrus-> Lateral dorsal prefrontal cortex



# Future Research

- Current design with Dr. Salnaitis, Dr. Cassill, and Dr. Hardy is to investigate speech perception in bilingual adults with traumatic brain injury using gating methodology and functional near infrared spectroscopy (fNIRS) to better identify bilingual speech perception and brain localization of function.
- Stay tuned. Thank you.